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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/781,685	02/20/2004	Yoichi Mizuno	501.43407X00	3681

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EXAMINER

KO, DANIEL BOKMIN

ART UNIT	PAPER NUMBER
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2189

DATE MAILED: 08/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/781,685	Applicant(s) MIZUNO ET AL.	
	Examiner Daniel B. Ko	Art Unit 2189	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 9-22 is/are rejected.
- 7) ☒ Claim(s) 7 and 8 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 4/20/2005
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

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DETAILED ACTION

This action is responsive to the application filed on February 20, 2004. Claims 1-22 have been submitted for examination.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

1. Claims 6-8 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 6-8 contain the clause "an estimated restore time for incremental backup is calculated by dividing the cumulative total size of changed blocks after full backup by the estimated restore time." It seems an estimated restore time is calculated by dividing the total size of changed blocks by the estimated restore time. How can the estimated restore time be calculated by dividing something by the estimated restore time? Perhaps, Applicants intended the second occurrence of "estimated restore time" to be "estimated restore performance".

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

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the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

2. *Claims 1-6 and 9-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitagawa et al. (US Patent 5,522,037) in view of Akamatu et al. (US Patent Application 2004/0078628 A1).*

Regarding claim 1, Kitagawa et al. teaches a storage system comprising:

a disk controller (Fig. 1, elements 16-1 to 16-3, I/O control apparatus for disk; column 9, lines 17-18) which has a CPU, a main memory, and an interface (a disk controller contains some kind of processor, memory and interface is inherent); and

a disk device which has original volumes (Fig. 2, element 52; column 9, lines 58-62) for backup and a storage pool (Fig. 2, element 62, Backup Destination Medium; column 10, lines 34-37; Fig. 1 shows a multiple disks such as 24-1 to 24-3) for backup data,

wherein:

the main memory incorporates: a differential management program which checks whether the original volumes for backup are updated or not (Fig. 2, element 44, Data Updating Process Section; column 9, lines 44-45 and 60-66); a pool management program which allocates a disk area for storage of backup data to the storage pool for backup data (Kitagawa et al. teaches a backup system and allocating a disk area for storage of backup data is inherent in backup system); and a backup control program which issues an instruction to the differential management program, the pool management program, and the performance management program for total backup control (Kitagawa et al. teaches a backup system and issuing a backup instruction to backup management program is obvious).

Kitagawa et al. fails to teach a recovery object time and a performance management program.

Akamatu et al. teaches a system and a method for reorganizing an execution schedule of operations when a failure occurs in a storage device by determining the recovery time (See abstract).

Akamatu et al. teaches recovery within a user-specified recovery object time is possible (Fig. 2, element 205, limiter setting; page 2, paragraph 27), according to a restore performance calculated by the performance management program and the total size of changed blocks after backup acquisition as counted by the differential management program (page 3, paragraph 33; Akamatu et al. teaches determining the

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period of time required for the recovery of the disk device by total capacity of each file divided by transfer rate).

Akamatu et al. also teaches a performance management program which manages the performance of each volume of the disk device (Fig. 1, element 123, disk management module; page 2, paragraph 24; a second function of disk management module is monitoring writing/reading of data to/from the disk devices).

At the time of invention it would have been obvious to a person of ordinary skill in the art to combine the Kitagawa et al. with the Akamatu et al. The motivation for doing so would have been a faster recovery (See Akamatu et al., page 1, paragraph 2; when a failure occurs in a computer storage system, operations are required to recover as quickly as possible) from failure of disk. Akamatu et al. discloses the formula that $[\text{Recovery time}] = [\text{constants}] + [\text{capacity}] / [\text{transfer rate}]$ (page 3, paragraph 33) and Kitagawa et al. discloses the selecting backup methods based on the capacity. It is obvious that capacity (total size of changed blocks in Applicant's claim) divided by transfer rate (a restore performance in Applicant's claim) will give estimated recovery time as applicant's invention. Therefore, it would have been obvious to implement Akamatu et al.'s judging from conditions of the disk recovery time (page 1, paragraph 6) with Kitagawa et al.'s invention.

Regarding claims 2, 10, 16 and 20, Kitagawa et al. teaches full backup (Fig. 11, element S4; column 13, lines 32-45), differential backup (Fig. 11, element S5; column

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13, lines 42-45), or incremental backup is selected as the backup method. Incremental backup is obvious variation of differential backup because incremental backup only backup a part, which is changed after the time point of the previous backup.

Regarding claims 3, 11, 21 and 22, Kitagawa et al. teaches the recovery object time is specified on a setup screen provided by a backup setup program in a management console connected with the storage system (column 10, lines 53-61). Kitagawa et al. fails to teach recovery object time. Akamatu et al. teaches a recovery object time (page 3, paragraph 33; recovery time formula).

Regarding claims 4, 12, and 17, Kitagawa et al. teaches the setup screen provided by the backup setup program (column 10, lines 53-61) has fields for entry of recovery point objects including time, hour, total size of changed blocks, and the number of generations and a recovery time object. Kitagawa et al. fails to teach recovery points objects. Akamatu et al. teaches a recovery object objects including time, hour, total size of changed blocks, and the number of generations and a recovery time object (page 2, paragraph 27; Akamatu et al. discloses start time 202, execution time 203, limiter setting 205, a file to be used 206, a status 207 and the number of generation is obvious element for incremental backup that can be implemented in the setup screen).

Regarding claims 5, 13, and 18, Akamatu et al. teaches the restore performance is estimated based on a write performance or a read performance, whichever is lower (page 2, paragraph 24; a second function of disk management module is monitoring writing/reading of data to/from the disk device; page 3, paragraph 33, transfer rate). It is obvious that in order to figure out the bottleneck of the performance (read or write transmission rate), the lowest performance for total system is used.

Regarding claim 6, Akamatu et al. teaches the storage system, wherein, under the backup control program:

an estimated restore time for incremental backup is calculated by dividing the cumulative total size of changed blocks after full backup by the estimated restore time (Fig 5, element 501; page 3, paragraph 33);

a decision is made as to whether the calculated estimated restore time is within the recovery object time (Fig 5, element 503; page 3, paragraph 35; Akamatu et al. discloses a step that a judgment is made as to whether or not the operation can be completed within the recovery time of the disk);

Akamatu et al. fails to teach step of if it is within the recovery object time, a changed part of the original volume for backup is copied into the storage pool for backup data to acquire an incremental backup. Kitagawa et al. teaches a changed part of the original volume (Fig. 14, Kitagawa et al. discloses bitmap for updated data) is copied into the storage pool for backup data to acquire an incremental backup (Fig. 11, column 13, lines 42-65).

Regarding claim 9, Kitagawa et al. teaches a storage system that is connected through a data transfer line with a backup storage system which has a volume for storage of backup as a backup destination (Fig. 2); a data transfer program which transfers data between the storage system and the backup storage system; a backup destination management program which manages the backup volume for backup data (Kitagawa et al. teaches a backup system and transferring data between the storage system and the backup storage system and also managing the backup volume is obvious feature of backup system). Rest of elements in claim 9 is same as claim 1. See claim 1 rejection above.

Regarding claim 14, Kitagawa et al. teaches a backup system and receiving a storage volume for backup data and determining where to store backup data is obvious feature of backup system.

Regarding claim 15, Akamatu et al. teaches a backup server (Fig. 1, element 130; page 1, paragraph 20) that manage backup data on a file-by-file basis (page 2, paragraph 27; Akamatu et al. discloses the file to be used 206 is a file, or files, required to execute the operation). Akamatu et al. teaches the backup server comprises a software program is stored in the storage unit of the backup server (page 2, paragraph 26). So, backup server contains backup software and a backup setup program obvious.

Rest of elements in claim 15 is same as claim 1. See claim 1 rejection above.

Regarding claim 19, Kitagawa et al. teaches a backup method for a storage system which comprises the method comprising the steps of:

the differential management program counting the total size of changed blocks after a previous backup acquisition (column 13, lines 45-53);

selecting a backup method by which recovery (column 13, lines 53-57) within the object time is possible.

Kitagawa et al. fails to teach a performance management program and deciding step whether the calculated estimated restore time is within a recovery object time.

Akamatu et al. teaches a performance management program which manages the performance of each volume of the disk device (Fig. 1, element 123, disk management module; page 2, paragraph 24);

the performance management program calculating estimated restore time for backup by reading a write performance and a read performance and taking the lower performance (page 2, paragraph 24; page 3, paragraph 33, taking lower is obvious, See Reasoning for claim 5) as an estimated restore performance and dividing the total size of changed blocks by the estimated restore performance (page 3, paragraph 33);

deciding whether the calculated estimated restore time is within a user-specified recovery object time or not (Fig 5, element 503; page 3, paragraph 35). Rest of elements in claim 19 is same as claim 1. See claim 1 rejection above.

Allowable Subject Matter

3. Claims 7 and 8 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel B. Ko whose telephone number is 571-272-8194. The examiner can normally be reached on 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mano Padmanabhan can be reached on 571-272-4210. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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Daniel Ko

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Kevin Verbrugge

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PRIMARY EXAMINER**